

DRAFT DOCUMENT
Transportation Options
for Reducing Carbon Dioxide
June 12, 2004

BACKGROUND

The goal of this effort is to reduce greenhouse gas (GHG) emissions from transportation related activities in Oregon. Oregon can achieve this goal by reducing the rate of increase in personal vehicle miles traveled, optimizing freight movement, driving more fuel-efficient vehicles, and using low carbon-content fuels. As a result, Oregonians will live in a healthier environment and show leadership in meeting the challenge of global warming.

In Oregon there are over 3.1 million motor vehicles registered for roadway use. Oregonians spend more than \$3 billion for transportation fuels each year. In order to play our role in stabilizing the world's climate, we must substantially reduce transportation's GHG emissions.

Transportation is Oregon's single largest contributor to poor air quality and global warming -- more than each of these other energy use sectors: industrial, commercial or residential. More than one-third of Oregon's carbon dioxide (CO₂) emissions are from transportation.

This includes cars, light trucks, sport utility vehicles (SUVs), buses, large trucks, trains and marine. This does not include residual (Bunker C) used for ocean shipping. Ocean vessel bunkering in Oregon is driven primarily by the relative prices of residual fuel in various ports. As a result, its use fluctuates erratically.

A balanced approach is needed to meet Oregon's climate, air quality and transportation efficiency objectives. Alternative transportation fuels can provide lower emissions and insulation from petroleum price spikes. Using hybrid gas-electric and hybrid diesel-electric vehicles can provide benefits similar to alternative fuels, often at lower costs. A reduction in emissions from all transport sectors can result in a more stable climate, cleaner air, and more livable communities.

UNCERTAINTY IN RANKING OPTIONS

The Technical Sub-committee on transportation found it very difficult to rank options based on their GHG emission savings potential. Although the group attempted to rank these options based on individual experience, the rankings can be misleading for a number of reasons:

Options vary in the degree stringency – A fuel tax of \$.05 per gallon will have different effect on emissions than a tax of \$1.00 per gallon, and will have correspondingly different economic repercussions. Fuel economy or emission standards could be set at various levels, thus affecting the level of GHG savings.

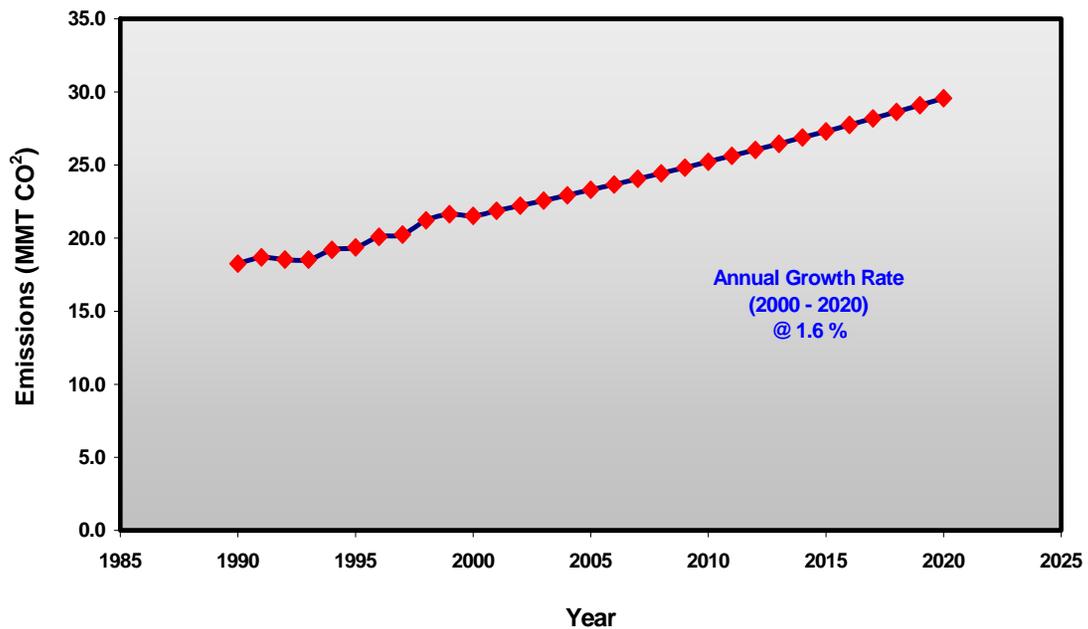
Estimates of effectiveness rely upon key economic and behavioral assumption, which are somewhat uncertain. Strategy effectiveness depends upon the response of travelers to changes in fuel prices (price elasticity), non-monetary travel costs (i.e. time) and land use patterns. Alternative assumptions about economic parameters and determinants of travel demand can also lead to different policy impacts.

The effectiveness of strategies varies over time. For example, a fuel price increase may encourage individuals to reduce miles traveled in the short term. But over the long term, consumers may shift towards more fuel-efficient vehicles, which lowers fuel cost per mile. This may, in turn, lead to a return to previous driving patterns or reduce the impact of future fuel price increases.

BASE CASE EMISSIONS AND TRENDS IN THE TRANSPORTATION SECTOR

According to the Energy Information Administration (EIA) data, the 1990 Oregon emissions were 18.3 MMT CO₂. By the year 2000, emissions reached 21.5 MMT CO₂, for an annual growth rate of 1.6 percent. Based on the Oregon Department of Transportation's forecast for taxed fuels and U.S. Department of Energy forecasts for jet fuel and freight diesel, the Oregon Department of Energy (ODOE) forecasts a annual growth rate of 1.6%, leading to emissions of 29.6 MMT CO₂ by the year 2020. The base case transport CO₂ emissions grow 38 percent between 2000 and 2020.

Historic and Projected CO2 Emissions from Transportation Use in Oregon



CATEGORY I: Significant Measures for Immediate State Actions

TRAN 1

Integrate Land Use and Transportation Decisions

Support continued integration of land use and transportation planning to reduce the rate of vehicle miles traveled (VMT) in the state. Adopt principles below for the Division of Land Conservation and Development, Metropolitan Planning Organizations (MPOs), and local governments. Consider policies to further limit sprawl and encourage efficient development of residential, commercial, and industrial lands.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Government Agencies	Planning, Regulatory	Unknown	Small/Medium	Local, State

Specific Actions:

- Through local planning and state policy, target infrastructure investments in Green House Gas (GHG) efficient locations (locations where people’s homes are located near the places they regularly go).
- Promote a Location Efficient Mortgage pilot program, such as Fannie Mae’s Smart Commute™ Initiative to encourage homeownership near public transportation.
- Ensure that MPO regional planning efforts assess and minimize and GHG emissions.

TRAN 2

Review (and change rules) of Existing Incentives for Purchasing Energy Efficient Vehicles

The Oregon Department of Energy offers tax credits to assist the added costs of alternative fuel vehicles. These tax credits should be based on the fuel-efficiency and polluting qualities of the vehicle, rather than the vehicle technology.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
ODOE	Legislative, Policy	Unknown	Small	State

Specific Actions:

- Review (and change if necessary) the Business Energy Tax Credit and the Residential Tax Credit programs to ensure that they are effectively promoting the purchase of more fuel-efficient vehicles.
- Implement a carbon tax or systems benefit charge for investment in GHG reduction measures.

TRAN 3

a) Adopt Low Emission Vehicle-Zero (“LEV-ZEV”) Emission Vehicle Standards

Establish emission standards for cars and light trucks in Oregon. Under federal law, Oregon is allowed to adopt California’s stricter tailpipe standards. This would ensure auto-makers sell in Oregon only those passenger vehicles that produce less air pollution and fewer global warming gases than the national average. Current California emission requirements are for LEV-AEV. These standards are a prerequisite for adopting Paveley (TBD).

Primary Target	Approach	Costs \$	GHG Savings	Implementation
DEQ	Regulatory	\$300 per vehicle?	Small	State

Specific Actions:

- Adopt in DEQ rules the approval of the California (LEV) tailpipe emissions standards.

b) Adopt CO₂ Tailpipe Emission Standards (per California “Paveley” standards)

Establish emission standards for cars and light trucks in Oregon. Under federal law, Oregon is allowed to adopt California’s stricter tailpipe standards. This would ensure auto-makers sell in Oregon only those passenger vehicles that produce less air pollution and fewer global warming gases than the national average.

By January 1, 2005, the California Air Resources Board (CARB) will develop regulations that achieve “the maximum feasible and cost-effective reduction of GHG emissions” from passenger vehicles and light-duty trucks. The California legislation requiring CARB to develop these GHG regulations explicitly states that CARB cannot impose taxes or restrict speed limits, vehicle size, or other consumer driving choices. It also gives auto-makers flexibility in meeting GHG emissions targets.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
DEQ	Regulatory	\$1500 per vehicle?	Medium	State

Specific Actions:

- Adopt in DEQ rules the approval of the California tailpipe emissions standards.

TRAN 4

Grow I-5 Corridor West Coast High-Speed Rail Service (long –term measure)

Amtrak service in the Pacific Northwest Rail Corridor (Eugene, OR – Vancouver, BC) is proving a worthy investment. Each year, rail passenger ridership on the Oregon segment increases. Train service cannot easily be restarted. State supported service discontinued in the early 1980s took 15 years to restart. In 1999, Pacific Northwest Rail Corridor service diverted more than 31 million miles of traffic from Oregon and Washington highways and prevented more than 717 tons of air pollution (“*ODOT Transcript,*” Vol. 8 No. 1, January 2000).

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Rail Industry	Policy, Incentive, Legislation	High	Small	State, Local

Specific Actions:

- Establish Legislation to find a stable source of funding, rather than having to rely on General Fund disbursements every biennium.

CATEGORY II: State Advocates with Other Authorities (Significant GHG)

No Measures at this time.

CATEGORY III: Significant Measures for Immediate State Actions

TRAN 5

GHG ‘cap & trade’ within PDX ‘bubble’ (Other ‘bubbles’?)

The operators of Logan Airport (Massport) have established a cap on airport emissions; any emissions increases that result from airport activity must be offset by on-airport emission reductions, reductions near the airport, or by purchasing reductions in emissions elsewhere. PDX could do the same.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Air Travel	Voluntary	Unknown	Medium	State

Specific Actions:

- Convene a task force to consider a “cap-and-trade” approach.
- Explore the option of the Climate Trust to serve as the broker for emissions trading.

TRAN 6

Set and Meet Goals for Reduced Diesel Consumption by Ships in Ports (shore power)

Under the West Coast Governors’ Global Warming Initiative Emission Reductions at Truck Stops – ‘Working Group 2 Report’, the three states are committed to reduce emissions from Ship emissions in ports. These include diesel particulate matter (“diesel PM”), smog-forming oxides of nitrogen (“NOx”) and GHG emissions. Because they consume large amounts of petroleum-based fuels, ships account for roughly two to four percent of global emissions of carbon dioxide (“CO₂”) and roughly five percent of the U.S. emissions from the transportation sector. While in port, ships typically use large diesel engines to generate onboard electricity; and large ships can use several megawatts of power while docked.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Marine Industry	Policy, Incentive	Unknown	Small	State, Local

Specific Actions:

- Reducing electrical power generated from onboard diesel engines while marine vessels are docked by substituting power produced by on-shore facilities.
- Promoting additional measures to reduce ship emissions by improving fuel quality used by ships when in-port or in-transit along the Pacific Coast.
- Maximizing the reductions of health-threatening pollutants, such as diesel PM and smog-forming NO_x, which are significant co-benefits to measures that reduce GHG emissions from ships.
- Ensuring that compatible programs are pursued at major West Coast ports.

CATEGORY IV: Second-tier Measures for Immediate State Actions

TRAN 7

Incorporate Global Warming Impacts into Transportation Funding Decisions

Incorporate climate change as a key criterion in Oregon Department of Transportation (ODOT) funding decisions, giving priority to those service improvements and expansions that offer the greatest GHG reductions.

The Oregon Road User Fee Task Force is charged with developing a road user fee that will eventually replace the gas tax. While a Vehicle Miles Traveled fee might make sense from a road-user equity perspective, a switch to such a fee might influence consumers to purchase less fuel-efficient vehicles, as the cost impact of different fuel efficiencies (miles per gallon, MPG) will be less.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
ODOT	Policy, Program Dev.	Unknown	Small	State

Specific Actions:

- Forecast GHG emissions in regional Transportation Improvement Plans (TIPs) and long-range metropolitan transportation plans.
- Communicate to the Oregon Road User Fee Task Force the need to keep incentives in place for the purchase of fuel-efficient vehicles.
- Identify and fund strategic transportation investments that reduce GHG emissions, such as pedestrian improvements in high-use corridors where transit providers are looking to implement frequent service lines.
- Reduce traffic congestion and optimize highway speeds to the preferred range.

TRAN 8

“Transportation Choices Programs” and “Travel Smart Pilots”

The Department of Environmental Quality (DEQ) manages the Employee Commute Options program, and the Department of Energy (ODOE) provides tax credits and technical assistance to businesses that encourage alternatives to driving alone, such as telecommuting. Transportation Management Associations (TMAs) work with major employers to reduce single occupancy vehicle commuting. TMAs assist in coordinating vanpools, carpooling, formation of transit pass programs, and offer information about transportation demand management options.

TravelSmart is a social marketing program that identifies individuals who *want* to change the way they travel, motivates them to think about their travel options and provides them with information about how to use transit, bike, walk or carpool for some of their trips.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Agencies, Public	Coordination	\$100,000	Small	Local, State

Specific Actions:

- Expand City of Portland TravelSmart programs.
- Expand CarpoolMatchNW.org statewide and enhance marketing.
- Provide incentives for investment in station car services (car-sharing link to mass transit).
- Using existing transit and social service programs, promote the state’s use of additional flexible federal funds to support the efforts of transit providers to coordinate elderly and disabled transportation options.

TRAN 9

Encourage Sales of Low Rolling Resistance Tires

Fuel efficiency is directly related to rolling resistance (RR). The greater the RR, the more fuel is burned. The average RR of replacement tires is about 20% higher than that of tires that automakers put on new cars. Ecos Consulting estimates the fuel efficiency savings of using “low rolling resistance” (LRR) tires at 3% and that a typical driver would save \$87 to \$260 on fuel at an incremental cost of \$9 to \$22 for two sets of LRR tires.

The California Legislature passed legislation in 2003 requiring the state to implement by 2008 a replacement tire efficiency program that is designed to ensure that replacement tires sold in the state are at least as energy efficient, on average, as the original equipment.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Retail, Consumers	Incentives, Education, Legislation	Unknown	Small	State, Local

Specific Actions:

- Use the states’ combined purchasing power to reduce petroleum dependence by obtaining fuel-efficient vehicles and low-rolling resistance tires for motor pool fleets.
- Ensure state procurement by requiring state fleets to purchase LRR tires.
- Develop a marketing program with tire dealers and consumers to encourage the purchase of LRR tires. This effort might include a voluntary labeling program for tire fuel efficiency.
- Alternate 1: Establish West Coast mandatory labeling requirement.
- Alternate 2: Establish legislation to set fuel-efficiency standards for tires.

TRAN 10

Reduce GHG Emissions from Government Fleet Purchase and Vehicle Use

Public fleets can lead by example in implementing effective purchasing policies and best maintenance practices. The following actions are intended is not only to improve pricing and other factors for the states’ purchases, but also to have a positive impact on the market for efficient vehicles and replacement parts.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
State Fleets	Policy	Unknown	Small	State, Local

Specific Actions:

- Use the states’ combined purchasing power to reduce petroleum dependence by obtaining fuel-efficient vehicles and low-rolling resistance tires for motor pool fleets.
- Seek a change in the implementation of the federal Energy Policy Act of 1992, which currently excludes hybrid vehicles as an allowable mechanism for compliance with the alternative fuels in state fleets requirement.
- As the fleet turns over, require all state vehicles to be low-GHG and the most efficient in their class, including the statewide transit fleet (Tri-met)
- Coordinate emission standards for fleet vehicle specifications.
- Develop a model “Green Fleet” Policy Statement that describes policies and/or standards that consider best practices for fleets in a comprehensive way.
- Provide training for fleet managers on how to educate employees about fuel-efficient driving, optimize vehicle operation and maintenance, and reduce the need to travel.
- Encourage EPA to label vehicles based on CO₂ emissions.

TRAN 11

Set up Traffic Flow Engineering “Best Practices”

Truck and auto travel is most energy efficient when the vehicles travel in the 40 to 50 mph range, without frequent stops and starts. Optimize traffic flow through targeted infrastructure investments, traffic signal re-timing, value pricing, and investments in alternatives to the automobile. Account for “induced demand” in the analysis. Projects that improve traffic flow through road widening or traffic management strategies may reduce fuel use in short-term if vehicles operate at more efficient speeds with less braking and accelerating. However, increasing or improving road capacity has been shown to attract more drivers thereby increasing VMT and eroding GHG benefits.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Gov. Agencies, Public	Policy	Unknown	Small	State, Local

Specific Actions:

- Expand Portland Office of Transportation and Portland Office of Sustainable Development programs to use Climate Trust funding to improve signal timing.
- Enforce speed limits.
- Apply Intelligent Transportation System solutions (e.g., traffic signal re-timing).
- Identify, prioritize and eliminate bottlenecks on highways.
- Analyze potential projects utilizing value pricing.

TRAN 12

Adopt Lower Vehicle Registration Fee for LEV’s (alt: free parking?)

The state could shift the amount drivers pay to title and register their cars in a revenue neutral manner, raising the \$55 title transfer fee and \$27 per year registration fee for cars with below average MPG (US Department of Energy miles per gallon rating) and lowering the fees for more efficient vehicles. This would have mostly a symbolic effect as the increased cost would be about the cost of a fill-up. Raising the fee for less efficient vehicles but maintaining the fee for more efficient vehicles could have more impact. In the latter scenario, the additional funds could be used to fix Oregon’s bridges and roads.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Consumers	Regulatory, Legislative	Unknown	Small	State

Specific Actions:

- Pursue legislative approval of a climate-friendly vehicle registration fee.
- Adopt a vehicle mile registration fee.

TRAN 13

Government switch to “Clean Diesel” fuel and vehicle purchases, retrofits

The Department of Environmental Quality (DEQ) is working to promote voluntary retrofit of diesel engines, in both on- and off-highway situations. Users of heavy-duty diesel engines who retrofit with emission controls can qualify for a credit against Oregon income taxes of up to 35% of the retrofit costs. Retrofits would reduce emissions of black carbon (soot), which contribute to the greenhouse effect.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
State Gov., Public	Incentives, Regulatory	Unknown	Small	State, Local

Specific Actions:

- Support DEQ’s efforts to create a buying club for ultra low sulfur diesel fuel, as well as its work to promote diesel engine retrofits to reduce carbon black emissions.
- Establish a state contract requirement for low-emission fleets and construction equipment.
- Clean up Oregon’s school bus fleet by providing funding for replacement of older school buses, retrofit of newer school buses, and purchase of biodiesel fuel. This would have immediate positive impacts on children’s health and safety and would result in CO₂ reductions, as well as black carbon (soot) emissions.

TRAN 14

Promote Biodiesel Use and Production

Biodiesel is a clean burning alternative fuel, produced from domestic, renewable resources. Biodiesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a biodiesel blend. It can be used in compression-ignition (diesel) engines with little or no modifications.

According to a USDOE/USDA lifecycle analysis, biodiesel has the highest energy balance of any fuel. For every one unit of fossil fuel it takes to produce biodiesel, 3.2 units of energy are gained (using renewable fuel crops). That same study concluded that biodiesel also results in a 78% lifecycle reduction in carbon dioxide.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
State Gov., Industry, Public	Incentives, Regulatory, Legislation	Unknown	Medium	State, Local

Specific Actions:

- Establish fuel standards that meet engine maker’s requirements.
- Require nearly all diesel fuel sold in the state to contain at least 2% biodiesel by the time Ultra Low Sulfur Diesel (ULSD) fuel is mandated by the federal government (mid 2006), but only if the in-state biodiesel production has reached 15 million gallons. ULSD requires the use of a lubricity additive; biodiesel is a non-toxic lubricity agent.
- Mandate a minimum biodiesel content for all state fueling stations.
- Expand and review incentives for producers, blenders or retailers, such as corporate income tax credits and tax credits on equipment.

TRAN 15

Promote Ethanol Use and Production

This alcohol fuel is usually mixed with gasoline at 85 percent ethanol and 15 percent unleaded gasoline to form what is called E-85. Currently, gasoline in Oregon has 0 to 10 percent ethanol, with an overall average of 2 to 3 percent. Typically derived from distilling corn, ethanol is also a byproduct of starch manufacturing. Ethanol can be made from cellulose (e.g., woody crops, wood waste, switchgrass, agricultural residues, municipal solid wastes) and generates substantially fewer GHGs than fossil fuels or ethanol made from corn. Currently, E-85 is not commercially available in Oregon.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
State Gov., Public	Incentives, Regulatory	Unknown	Small	State, Local

Specific Actions:

- Require or subsidize increased levels of ethanol blending of gasoline in Oregon.

TRAN 16

Maximize Use of Fuel-Efficient Ground Support Equipment

The Port of Portland has made great strides in this area. All PDX gates are equipped with electrical power systems, as well as drinking water dispensing systems to eliminate the need for water trucks. Over 30% of the Port-wide fleet is alternative-fuel (CNG, ULSD) or hybrid vehicles. And all Port-owned diesel vehicles at the airport utilize 20% biodiesel. The Port has also taken many steps to minimize traffic congestion around the airport, like MAX. In addition, PDX has replaced 2 stroke landscaping equipment with 4 stroke models, uses super energy efficient lighting in many of its facilities, has increased recycling, and purchases green power.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Air Travel	Policy	Unknown	Small	Port of PDX

Specific Actions:

- Ensure that other airports have the capacity to reduce emissions from ground support equipment.

TRAN 17

Set and Meet Goals for Freight (truck/rail) Transportation Efficiency; Achieve through Equipment, Coordination, and Land Use

Make strategic investments in multi-modal freight transportation options (e.g., rail, shipping, waterways, and any of these in combination with road transport). Utilize Intelligent Transportation Systems (ITS) to maximize freight efficiency.

Freight railroads move a significant percent of the nation's freight and connect businesses with each other across the country and with markets overseas. Railroads are leaders in conserving environmental resources. They have introduced new technologies and implemented cutting-edge solutions to make freight rail transportation "cleaner and greener" and safer than ever.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Freight Industry	Coordination, Regulatory	Unknown	Small or Medium	State, Local

Specific Actions:

- Site industrial land/facilities along key freight corridors. Encourage warehouse and distribution center development in existing metropolitan areas.
- Work with ports statewide to adopt “green port” goals, e.g., promoting a rail/truck/barge mode split that reduces port-related VMT and promoting mass transit use by port employees.
- Enable Hillsboro airport to accommodate larger aircraft.
- Increase rail fuel efficiency
- Alleviate rail traffic congestion

TRAN 18

Set and Meet Goals for Reduced Truck Idling at Truck and Safety Stops

Develop infrastructure to reduce idling by diesel trucks at truck stops and safety stops. Currently, technology exists to outfit truck stops with a custom heating, ventilation and air conditioning (HVAC) system that can be ducted directly to the truck, eliminating the need for idle power.

Under the West Coast Governors’ Global Warming Initiative Emission Reductions at Truck Stops – ‘Working Group 2 Report’, the three states are committed to reduce emissions from diesel fuel in transportation by creating a system of for reducing emissions at truck stops along the I-5 corridor that stretches from Canada to Mexico.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
Industry, Gov. Agencies	Coordination, Seek Funding	\$1.0-1.5 million	Small	State

Specific Actions:

- Establish a core network of facilities along the west coast Interstate 5 (I-5) corridor that will enable truck drivers to rest or “overnight” in their sleeper cabs without idling their truck engines.
- Instituting similar and compatible programs to encourage truck operators to use these facilities as they are established.
- DEQ and ODOE secure federal funding and carbon offset funding for alternatives to engine idling.
- Market existing incentives to support deployment of this technology.
- Increase the number of trucks participating in Oregon’s “Green Light” program. Green Light allows trucks to pass over weigh-in-motion scales and under transponder readers to pre-clear the weigh station thus cutting down on idling.

CATEGORY V: Public Information: RD&D

Consumer Awareness Education Link to Transportation Choices

Develop an education program to raise public awareness about the connection between global warming and driving. Focus on the benefits of low-GHG vehicles and available incentives for their purchase, as well as ways to boost fuel efficiency through driving techniques and vehicle maintenance.

Primary Target	Approach	Costs \$	GHG Savings	Implementation
DMV, Non-profits	Consumer Awareness, Incentives	\$250,000-500,000	Small	State, Local

Specific Actions:

- Develop an educational campaign to promote fuel-efficient driving behavior and best practices auto maintenance to be used as part of driver education classes in public schools, Department of Motor Vehicles programs, and Vehicle Inspection Program outreach. Develop a state lottery game around the theme of fuel-efficient driving.
- Offer drivers an opportunity to donate to the Climate Trust to offset their CO₂ emissions. Require that car registration materials (or car titling materials) include an educational brochure about fuel-efficient driving.
- Work with car dealers to promote the sale of GHG-efficient vehicles.
- Team up with gas stations to develop an anti-idling campaign, e.g., “Turn your key and be idle free.”
- Team up with the automotive service industry to offer "green" auto maintenance options to drivers either in conjunction with maintenance work or oil changes.

CATEGORY VI: New Proposals

State Bonding to Finance EE Programs/Investments in Efficient Transportation Infrastructure

Details forthcoming